SEQUENCE LISTING

<110> BARBAS, C. F. RADER, C.	
<120> HUMANIZATION OF MURINE ANTIBODY	
<130> TSRI 598.0-CON1	
<150> US 08/986,016 <151> 1997-12-05	
<160> 56	
<170> FastSEQ for Windows Version 4.0	
<210> 1 <211> 8 <212> PRT <213> amino acid	
<400> 1 His Asn Tyr Gly Ser Phe Ala Tyr 1 5	
<210> 2 <211> 9 <212> PRT <213> amino acid	
<400> 2 Gln Gln Ser Asn Ser Trp Pro His Thr 1 5	
<210> 3 <211> 37 <212> DNA <213> nucleic acid	
<400> 3 gggcccaggc ggccgagctc cagatgaccc agtctcc	37
<210> 4 <211> 37 <212> DNA <213> nucleic acid	
<400> 4 gggcccaggc ggccgagctc gtgatgacyc agtctcc	37

<210> 5 <211> 37 <212> DNA <213> nucleic acid	
<400> 5 gggcccaggc ggccgagctc gtgwtgacrc agtctcc	37
<210> 6 <211> 37 <212> DNA <213> nucleic acid	
<400> 6 gggcccaggc ggccgagctc acactcacgc agtctcc	37
<210> 7 <211> 23 <212> DNA <213> nucleic acid	
<400> 7 cagtaataca ctgcaaaatc ttc	23
<210> 8 <211> 23 <212> DNA <213> nucleic acid	
<400> 8 cagtaataaa ccccaacatc ctc	23
<210> 9 <211> 40 <212> DNA <213> nucleic acid	
<400> 9 gggcccaggc ggccgagctc gtgbtgacgc agccgccctc	40
<210> 10 <211> 40 <212> DNA <213> nucleic acid	
<400> 10 gggcccaggc ggccgagctc gtgctgactc agccaccctc	40
<210> 11 <211> 43 <212> DNA <213> pucleic acid	

<400> 11 gggcccaggc ggccgagctc gccctgactc agcctccctc cgt	43
<210> 12 <211> 46 <212> DNA <213> nucleic acid	
<400> 12 gggcccaggc ggccgagctc gagctgactc agccaccctc agtgtc	46
<210> 13 <211> 40 <212> DNA <213> nucleic acid	
<400> 13 gggcccaggc ggccgagctc gtgctgactc aatcgccctc	40
<210> 14 <211> 40 <212> DNA <213> nucleic acid	
<400> 14 gggcccaggc ggccgagctc atgctgactc agccccactc	40
<210> 15 <211> 40 <212> DNA <213> nucleic acid	
<400> 15 gggcccaggc ggccgagctc gggcagactc agcagctctc	40
<210> 16 <211> 40 <212> DNA <213> nucleic acid	
<400> 16 gggcccaggc ggccgagctc gtggtgacyc aggagccmtc	40
<210> 17 <211> 40 <212> DNA <213> nucleic acid	
<400> 17 gggcccaggc ggccgagctc gtgctgactc agccaccttc	40
<210 > 18	

<211> 21 <212> DNA <213> nucleic acid	
<400> 18 gcagtaataa tcagcctcrt c	21
<210> 19 <211> 44 <212> DNA <213> nucleic acid	
<400> 19 gctgcccaac cagccatggc ccaggtgcag ctggtgcagt ctgg	44
<210> 20 <211> 44 <212> DNA <213> nucleic acid	
<400> 20 gctgcccaac cagccatggc ccagatcacc ttgaaggagt ctgg	44
<210> 21 <211> 44 <212> DNA <213> nucleic acid	
<400> 21 gctgcccaac cagccatggc cgaggtgcag ctggtgsagt ctgg	44
<210> 22 <211> 44 <212> DNA <213> nucleic acid	
<400> 22 gctgcccaac cagccatggc ccaggtgcag ctgcaggagt cggg	44
<210> 23 <211> 24 <212> DNA <213> nucleic acid	
<400> 23 cgcacagtaa tacacggccg tgtc	24
<210> 24 <211> 21 <212> DNA <213> nucleic acid	
<400> 24	

acctattgcc tacggcagcc g	21
<210> 25 <211> 24 <212> DNA	
<213> nucleic acid	
<400> 25 cgcacagtaa tacacggccg tgtc	24
<210> 26	
<211> 8 <212> PRT	
<213> amino acid	
<400> 26 Asp Thr Ala Val Tyr Tyr Cys Ala 1 5	
<210> 27	
<211> 8	
<212> PRT <213> amino acid	
<400> 27 Asp Thr Ala Met Tyr Tyr Cys Ala 1 5	
<210> 28	
<211> 69	
<212> DNA <213> nucleic acid	
<pre><400> 28 gacacggccg tgtattactg tgcgcgtcat aactacggca gttttgctta ctggggc ggaaccctg .</pre>	cag 60 69
<210> 29	
<211> 42 <212> DNA	
<213> nucleic acid	
<400> 29 gaggaggagg aggagactag ttttgtcaca agatttgggc tc	42
<210> 30	
<211> 73 <212> DNA	
<213> nucleic acid	
<400> 30	

```
gaagattttg cagtgtatta ctgcccaaca gagtaacagc tggcctcaca cgtttggcca 60
                                                                    73
ggggaccaag ctg
<210> 31
<211> 21
<212> DNA
<213> nucleic acid
<400> 31
aatacgactc actatagggc g
                                                                    21
<210> 32
<211> 72
<212> DNA
<213> nucleic acid
<400> 32
gaggatgttg gggtttatta ctgccaacag agtaacagct ggcctcacac gtttggccag 60
                                                                    72
<210> 33
<211> 8
<212> PRT
<213> amino acid
<400> 33
Glu Asp Phe Ala Val Tyr Tyr Cys
<210> 34
<211> 8
<212> PRT
<213> amino acid
<400> 34
Glu Asp Val Gly Val Tyr Tyr Cys
1
<210> 35
<211> 69
<212> DNA
<213> nucleic acid
<400> 35
gaygaggctg attattactg ccaacagagt aacagctggc ctcacacgtt cggcggaggg 60
accaagctg
                                                                    69
<210> 36
<211> 50
<212> DNA
<213> nucleic acid
```

<pre><400> 36 agagagagag agagagagag cgccgtctag aattatgaac attctgtagg</pre>	50
<210> 37 <211> 7 <212> PRT <213> amino acid	
<400> 37 Asp Glu Ala Asp Tyr Tyr Cys 1 5	
<210> 38 <211> 7 <212> PRT <213> amino acid	
<400> 38 Phe Gly Gly Thr Lys Leu 1 5	
<210> 39 <211> 22 <212> DNA <213> nucleic acid	
<400> 39 aagacagcta tcgcgattgc ag	22
<210> 40 <211> 41 <212> DNA <213> nucleic acid	
<400> 40 gaggaggagg aggaggaggc gggcccagg cggccgagct c	41
<210> 41 <211> 21 <212> DNA <213> nucleic acid	
<400> 41 ggccatggct ggttgggcag c	21
<210> 42 <211> 42 <212> DNA <213> pucleic acid	

```
<400> 42
                                                                  42
qcaqaqccca aatcttqtga cactagtggc caggccggcc ag
<210> 43
<211> 41
<212> DNA
<213> nucleic acid
<400> 43
gaggaggagg aggaggagcc tggccggcct ggccactagt g
                                                                   41
<210> 44
<211> 130
<212> PRT
<213> amino acid
<400> 44
Leu Glu Glu Ser Gly Gly Leu Val Lys Pro Gly Gly Ser Leu Lys
                                    10
Leu Ser Cys Ala Ala Ser Gly Phe Ala Phe Ser Ser Tyr Asp Met Ser
Trp Val Arg Gln Ile Pro Glu Lys Arg Leu Glu Trp Val Ala Lys Val
Ser Ser Gly Gly Ser Thr Tyr Tyr Leu Asp Thr Val Gln Gly Arg
                        55
Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Thr Leu Tyr Leu Gln Met
Ser Ser Leu Asn Ser Glu Asp Thr Ala Met Tyr Tyr Cys Ala Arg His
                                    90
Asn Tyr Gly Ser Phe Ala Tyr Trp Gly Gln Gly Thr Leu Val Thr Val
Ser Ala Ala Lys Thr Thr Pro Pro Ser Val Tyr Pro Leu Ala Pro Gly
                            120
                                                125
Ser Ala
    130
<210> 45
<211> 109
<212> PRT
<213> amino acid
<400> 45
Glu Leu Val Met Thr Gln Thr Pro Ala Thr Leu Ser Val Thr Pro Gly
Asp Ser Val Ser Leu Ser Cys Arg Ala Ser Gln Ser Ile Ser Asn His
                                25
Leu His Trp Tyr Gln Gln Lys Ser His Glu Ser Pro Arg Leu Leu Ile
Lys Tyr Ala Ser Gln Ser Ile Ser Gly Ile Pro Ser Arg Phe Ser Gly
Ser Gly Ser Gly Thr Asp Phe Thr Leu Ser Ile Asn Ser Val Glu Thr
```

Glu Asp Phe Gly Met Tyr Phe Cys Gln Gln Ser Asn Ser Trp Pro His

```
85
Thr Phe Gly Gly Gly Thr Lys Leu Glu Ile Lys Arg Ala
            100
<210> 46
<211> 57
<212> DNA
<213> nucleic acid
<220>
<221> misc feature
<222> (1) ... (57)
<223> n = A, T, C \text{ or } G
<400> 46
ggtcccctgg ccaaacgtgt gaggmnnmnn mnnmnnctgt tggcagtaat acactgc
<210> 47
<211> 23
<212> DNA
<213> nucleic acid
<400> 47
                                                                    23
cctcaccgtt tggccagggg acc
<210> 48
<211> 21
<212> DNA
<213> nucleic acid
<400> 48
                                                                     21
agaagcgtag tccggaacgt c
<210> 49
<211> 109
<212> PRT
<213> amino acid
<400> 49
Glu Leu Val Met Thr Gln Ser Pro Glu Phe Gln Ser Val Thr Pro Lys
Glu Thr Val Thr Ile Thr Cys Arg Ala Ser Gln Asp Ile Gly Thr Ser
Leu His Trp Tyr Gln Gln Lys Pro Gly Gln Ser Pro Lys Leu Leu Ile
                             40
Lys Tyr Ala Ser Gln Pro Val Phe Gly Val Pro Ser Arg Phe Arg Gly
Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Tyr Ser Leu Glu Ala
                                         75
Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Ser Asn Ser Trp Pro His
```

Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys Arg Thr
100 105

<210> 50

<211> 118

<212> PRT

<213> amino acid

<400> 50

Gln Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Gln 1 5 10 15

Thr Leu Ser Leu Thr Cys Thr Val Ser Gly Ala Ser Ile Ser Arg Gly
20 25 30

Gly Tyr Tyr Trp Ser Trp Ile Arg Gln Tyr Pro Gly Lys Gly Leu Glu 35 40 45

Trp Ile Gly Tyr Ile His His Ser Gly Ser Thr Tyr Tyr Asn Pro Ser 50 55 60

Leu Lys Ser Arg Val Thr Ile Ala Ile Asp Thr Ser Lys Asn Gln Leu 65 70 75 80

Ser Leu Arg Leu Thr Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr 85 90 95

Cys Ala Arg His Asn Tyr Gly Ser Phe Ala Tyr Trp Gly Gln Gly Thr
100 105 110

Leu Val Thr Val Ser Ser

115

<210> 51

<211> 118

<212> PRT

<213> amino acid

<400> 51

Gln Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Gln
1 10 15

Thr Leu Phe Leu Thr Cys Thr Val Ser Gly Gly Ser Ile Ser Ser Gly 20 25 30

Gly Tyr Tyr Trp Ser Trp Ile Arg His His Pro Gly Lys Gly Leu Glu 35 40 45

Trp Ile Gly Tyr Ile His His Arg Ala Ala Pro Tyr Tyr Asn Pro Ser 50 55 60

Leu Lys Ser Arg Val Thr Ile Ser Val Asp Thr Ser Arg Asn Gln Ile 65 70 75 80

Ser Leu Lys Leu Arg Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr 85 90 95

Cys Ala Arg His Asn Tyr Gly Ser Phe Ala Tyr Trp Gly Gln Gly Thr 100 105 110

Leu Val Thr Val Ser Ser

115

<211> 118 <212> PRT

<213> amino acid

<400> 52

Gln Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Glu
1 5 10 15

Thr Leu Ser Leu Thr Cys Thr Val Ser Gly Gly Ser Ile Ser Ser Gly 20 25 30

Gly Tyr Tyr Trp Ser Trp Ile Arg Gln His Pro Gly Lys Gly Leu Glu 35 40 45

Trp Ile Gly Tyr Ile His His Ser Ala Gly Thr Tyr Tyr Asn Pro Ser 50 55 60

Leu Lys Ser Arg Val Thr Met Ser Val Asp Thr Ser Lys Asn Gln Leu 65 70 75 80

Ser Leu Lys Leu Thr Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr
85 90 95

Cys Ala Arg His Asn Tyr Gly Ser Phe Ala Tyr Trp Gly Gln Gly Thr 100 105 110

Leu Val Thr Val Ser Ser 115

<210> 53

<211> 118

<212> PRT

<213> amino acid

<400> 53

Gln Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Glu

1 10 15

Thr Leu Ser Leu Thr Cys Ser Val Ser Gly Gly Ser Ile Ser Ser Gly
20 25 30

Gly Tyr Tyr Trp Ser Trp Ile Arg His His Pro Gly Lys Gly Leu Glu

Trp Ile Gly Tyr Ile His His Ser Ala Gly Thr Tyr Tyr Asn Pro Ser 50 55 60

Leu Lys Ser Arg Val Thr Met Ser Ala Asp Thr Ser Lys Asn Gln Leu 65 70 75 80

Ser Leu Lys Leu Ala Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr 85 90 95

Cys Ala Arg His Asn Tyr Gly Ser Phe Ala Tyr Trp Gly Gln Gly Thr
100 105 110

Leu Val Thr Val Ser Ser 115

<210> 54

<211> 117

<212> PRT

<213> amino acid

<400> 54

<210> 55 <211> 109 <212> PRT <213> amino acid

<400> 55

<210> 56 <211> 117 <212> PRT <213> amino acid

<400> 56

Glu Val Gln Leu Glu Glu Ser Gly Gly Leu Val Lys Pro Gly Gly 1 5 10 15 15

Ser Leu Lys Leu Ser Cys Ala Ala Ser Gly Phe Ala Phe Ser Ser Tyr 20 25 30

Asp Met Ser Trp Val Arg Gln Ile Pro Glu Lys Arg Leu Glu Trp Val 35 40 45

Ala Lys Val Ser Ser Gly Gly Gly Ser Thr Tyr Tyr Leu Asp Thr Val

| Solution | Solution